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TABLE OF CONTENTS.

	PAGE.
EDITORIAL ARTICLES:—Old-fashioned Gardens	281
A Northern Forest. (With figure.)	282
The June Flora of a Long Island Swamp.....*Anna Murray Vail.*	282
FOREIGN CORRESPONDENCE:—London Letter.....*W. Watson.*	284
PLANT NOTES	284
CULTURAL DEPARTMENT:—American Irises.....*J. N. Gerard.*	286
Midsummer Care of Chrysanthemums.....*T. D. Hatfield.*	287
Some Showy Perennials.....*R. Cameron.*	287
Three Good Plants.....*E. O. Orpet.*	288
Strawberries.....*E. P. P.*	288
CORRESPONDENCE:—Stones as a Source of Fertility.....*T. H. Hoskins, M.D.*	288
RECENT PUBLICATIONS	289
NOTES	290
ILLUSTRATION:—Forests on the Thompson River, British Columbia, Fig. 40	285

Old-fashioned Gardens.

MOST things move in cycles, and contemporaneously with the reappearance of our grandmothers' sleeves and petticoats the taste for old-fashioned gardens is revived. There is a fresh call for the perennials and annuals which enlivened the borders of long ago, and those who are fortunate enough to still possess one of these old-time gardens show with pride the long-treasured plants which have bloomed for so many years. We are apt to think that we know a good deal more about flowers than our progenitors, but the fact is there was, perhaps, more variety than there is to-day in many of their collections. Much time is given now to the development of perfect specimens and to the cultivation of new varieties, both in greenhouse and garden; but if we were to look over some of the venerable catalogues we should find that if we planted all that our grandsires did we should have our hands and gardens full, without anything new.

McMahon's *American Gardeners' Almanac*, published in 1806, gives a list of four hundred hardy perennials and biennials for the garden, with a hundred and twenty hardy annuals, including climbers, and among these we find many plants which are supposed to be comparatively new. Those early settlers in America who were well to do devoted much care to their gardens, and in the formal fashion of the day laid out their geometrical walks and box-bordered beds and filled them with all sorts of sweet-smelling or showy posies which are forever associated in our minds with our grandmothers who loved them. The early colonists found new and wonderful flowers blossoming in the woods and fields of the new country and transplanted them into their borders, and sent specimens of them to their old home, receiving in return slips and seeds of the dear old shrubs and plants which were full of association to their homesick hearts. The interest on this side of the Atlantic kept pace with that in Europe, and only twenty years after the founding of the London Horticultural Society the little town of Boston in 1828 organized its own and showed a laudable interest in bringing up the floricultural standard.

In those early gardens all sorts of bulbous plants were grown, the passion for Tulips, which was at its height in Europe about the beginning of the eighteenth century, having lasted longer in the colonies; and the records show that Hyacinths and other early-blooming flowers were raised in great perfection and profusion.

Geraniums, Pæonies, Pansies, Pinks, Balsams, Four-o'clocks and Dahlias made their appearance in the borders in brave show. Columbines of various colors nodded everywhere. Lilies and Roses, then as now, were the joy of the gardener, and the trade-list of Parsons & Co., Flushing, Long Island, as early as 1830, contained over seven hundred kinds of Roses, while already two thousand different varieties had been named, though hybridization was then in its infancy. The China Aster and the Chrysanthemum were comparatively new and small, for the China Asters only began to reach England in 1730, and the improved sorts are of much later date, while the Chrysanthemum was but a sturdy little ball in the beginning of the nineteenth century, and was alluded to as "a neglected flower" as late as 1842. Carnations in many varieties, plain and striped, perfumed the air. There were the Flakes with stripes of two colors going the whole length of the petals. There were freckled and spotted ones, and Painted Ladies, with a white underpart to the petal, while the upper surface was red or purple, as if laid on with a brush. These latter have now so disappeared that few growers know they ever existed. Even the spotted ones have their colors now confined to the outer edge of the petals, and the freckles have gone out of fashion. Who does not remember the Clove Pinks which were such universal favorites, endless in variety, fragrant and fringed, and the little Maiden's Pink, which came so early, and the Chinese Pinks, with their deeply toothed petals?

There were Larkspurs, which sprang up everywhere, in all sorts of colors, from palest blue to indigo, from pure white to deep pink, with flowers poised like bees upon their stems, and stately stalks which lifted them high in air. There were masses of fragrant Stocks and rows of Balsams, whose impatient seeds flew at a touch, and bunches of the Sweet William, which seems now the most old-fashioned of flowers, and the Scarlet Lychnis, its appropriate neighbor, with stiff tall stem and red head aflame. We called it London Pride, but in England that name is given to Saxifraga umbrosa.

In June the beds were all ablaze with bouncing Pæonies, shading from white to deepest crimson, and later came the French Marigolds, in all shades of gold. There were Canterbury Bells, white and blue, and tall white Tuberoses of sickly sweetness, and Phloxes, white and pink, and big double Buttercups as large as little Roses, and the many-colored Marvel of Peru. Scarlet Bee Balm was a delight all summer long, and the Feverfew grew rank beside it. Who can forget the fragrant rows of Sweet Peas, which have never grown old-fashioned, and the swarms of Poppies of all kinds and hues, and the Clematis which climbed and trailed at its own will; and the wandering Honeysuckles and Sweetbrier which hummed with bees?

The charm of those old gardens was in their wealth and tangle of bloom. One plant leaned upon another. There was no room for weeds, for each flower stood cheek-by-jowl with a neighbor and frowned down the humble intruders. There was always a little shade in those gardens, perhaps a Pear-tree or two, or a choice Plum, which enjoyed the same care received by the blossoms, and rewarded in its turn with friendly shade. The spirit of those gardens came from the hands that tended them and culled their fragrant produce. They breathed love and thought and patient tending, and grew as flowers only grow for those who love them. Stiff in outline they might be, but the rampant growth of well-tended shrubs and perennials hid all straight lines and carpeted the paths with falling petals. One flower after another broke bounds and stretched over to its neighbor across the walk. The old Rose-bushes never would stay in place, but sent forth long shoots which dripped fragrance. The hedges were sweet with Haw-

thorn blooms; from the arbor came the breath of the Grape blossom as the long shoots waved in the summer breeze.

The fairest of these gardens were unsymmetrical ones, with winding paths that led by unexpected turns to some half-hidden bower wreathed in roses. Thither one strayed with hands full of flowers culled in passing, and, looking back along the path, saw arching sprays of color overhang and intertwine; and always there was perfume and wild charm and lonely grace in unexplored corners, and to one's dying day certain flowers, with their familiar odor, recall a scene perhaps vanished forever, and the old garden rises before the mind's eye ever fresh and fair and fragrant.

It is to be hoped that the taste for the renewal of these old gardens, with their fanciful suggestions, will grow, and that the vivid and practical young folks of the present day may learn to take an interest in them, and permit a little of the romance of the past to interweave itself with their memories. It is possible that there may be a revival of what is now scouted as "sentiment," even in our dry young Americans, who seem all for amusement and reform, and precious little for reflection and imagination. For them a garden is a botanical curiosity rather than a place for dreaming; and, alas! to many of them it is a bore. It may be that the fault is in the lack of suggestiveness of the modern garden, therefore let us hasten to make it once more the home of fancy and the graces like the ones which in our maturity we turn to with affectionate regret and loving memory.

An old-fashioned garden appeals to the mind as well as the eye, and whether formal or informal has about it something individual suggested by the mind of the owner. Its very tangles have a meaning, and its stiffness a significance. It is not one of many copies, but an expression, and that is what the finest gardens must ever be. In them one should read something of the characteristics of the guiding intelligence which shaped them into being and lifted them from mere conventional toys into works of art. While the landscape architect can suggest the general aspect of the grounds, the garden, which varies from year to year with changing plants, should reflect the taste and even whims of its owner, and in its general features take on characteristics of its own and become something beyond a mere show of curiosities. The plants of an old-fashioned garden were beloved, and are still justly beloved, for beauty and fragrance or for picturesque habit. He who would restore those gardens now, or establish worthy successors of them, should still cherish such shrubs and climbers as will give a perennial and familiar character to the whole scene, and let the new and strange be mainly the embroidery upon a garment of accustomed pattern. The arrangement may vary, but the theme should be the same from year to year, for what has been long an established fashion gains the charm of habit. There should be nooks where one loves to linger; corners where one Rose has blossomed for a score of years; shady beds where one may seek for shy wild flowers that have been brought hither from wood and hedgerow. There must be stretches where seedlings of all sorts, blown from the taller plants, will be sure to spring up without the care of sowing. One learns where to go for a flower in the dark, as for a book in a familiar bookcase, when time has consecrated the garden's arrangement; one side of the grounds may suggest reflection, the other labor, and room still be left for novelty and surprises. All this takes consideration and requires work and time; but the garden-lover begrudges neither to the perfection of his pleasance, and would value more lightly what cost him less exertion.

A large part of the charm of old gardens, as we have said, arises not so much from their splendor and luxuriance as from the affectionate toil and care they represent, which hallows the ground to us who remember the toilers. Into our modern grounds must be put the same thought and supervision if they are to mean anything to our successors or to bear real significance even to ourselves. Only by entering into the spirit which created the old-fashioned gardens can we ourselves leave behind others which shall be valued by future generations as those of a former day are now.

A Northern Forest.

OUR illustration on page 285 of this issue gives a good idea of the appearance of the forests which cover the narrow bottom-lands of streams in the region between the Rocky Mountains on the east and the coast ranges on the west, and north of the forty-eighth degree of latitude —a region which includes a large part of the interior of British Columbia and portions of Idaho and Montana. The tall spiral trees in the foreground of the illustration, which is made from a photograph taken on the Thompson River in British Columbia, belong to a peculiar form of the eastern Black Spruce, Picea Mariana, which on these bottom-lands grows to its largest size, often shooting up to the height of nearly two hundred feet a narrow pyramid clothed to the ground with dark green fragrant foliage. Alders and Willows form shrubby borders to these streams, white with the melting ice of living glaciers as they start bravely out on their long and troubled course to the sea; and a solitary Canoe Birch, a wanderer from the east, sometimes enlivens the scene with its snowy bark and slender graceful branches. Over the hills which rise abruptly from the streams the forest spreads to the very edge of the glaciers. On these hills the trees are smaller than on the richer and moister bottom-lands, but their variety is greater. By climbing to the timber line one may see the Mountain Hemlock, Tsuga Pattoniana, the fairest of all Hemlocks, two Firs, Abies amabilis and A. lasiocarpa or subalpina, and Engelmann's Spruce, Picea Engelmanni. These four trees constitute the principal part of the forest, but with them at high elevations are scattered individuals of the White-barked Pine, Pinus albicaulis. Near the streams which flow from the glaciers the moist ground is carpeted with thickets of Menziesia and with Rhododendron albiflorum, a dwarf shrub which covers itself at midsummer with pure white fragrant flowers. A noble Aralia, Fatsia horrida, in great masses, with spine-covered stems, enormous leaves and clusters of scarlet fruit which recall the tropics, makes it hard to realize that summer here lasts only a few weeks. Ferns, too, and mosses clothe the ground with almost tropical luxuriance, and many northern under-shrubs display their flowers among the melting snows. Less varied in their composition than the great coniferous forest, nourished by the moister air from the Pacific Ocean, and far less imposing in the size of the individual trees, these interior forests of the north have their own peculiar beauty, and for the traveler from more southern lands the charm of novelty.

The June Flora of a Long Island Swamp.

ONLY those that have watched the gradual growth and development of a field of wild flowers can realize the amount of enjoyment that can be derived from the daily inspection of a few acres of marshy meadow-land. Every visit reveals new beauties, and usually new plants, that, no matter how carefully every foot of ground has been gone over before, have escaped the rigid scrutiny of a plant-lover's eye. The swamp that has been the source of much pleasure and entertainment to me for three successive summers is situated at the head of a small pond, where for a very short part of the winter the salt water penetrates, but it is, however, essentially a fresh-water swamp. The spring that fills it starts in a low meadow, a short distance off, and grows rapidly into a little brook that spreads itself into a broad expanse of bog, widening here and there into broader pools that harbor many a delightful water-weed, till it ends half a mile away in deeper and clear water in the pond. It is divided into three portions: a sloping peaty meadow, that gradually becomes too soft and wet to cross; a long boggy stretch, principally filled with rushes;

and further on, an almost impenetrable thicket composed of a variety of shrubs and small trees, such as Andromeda, Leucothoë, Rhododendron, Clethra, Viburnum, Myrica and many others, most conspicuous among which are the Swamp Maples, with their pale leaves, and some very Japanesque-looking Tupelos, Nyssa sylvatica. Between the meadow and the road is a long row of fine aged White Willows, which in beauty rival the Elms for which East Hampton is justly famed.

The swamp and meadow were first visited this year on the 17th of June, and, besides Daisies, Buttercups and white and pink Clovers along the upper dry portion, it was filled all the way down to the bog with Blue-eyed Grass, Sisyrinchium Bermudiana. The plants were so thick everywhere that it seemed scarcely possible to step without crushing a hundred, and so tiny that their color did not affect the general tone of the meadow as did the masses of Meadow Soft Grass, Holcus lanatus, the spikes of which were not yet in bloom. A more beautiful sight can hardly be imagined. Whether the salt air helps the color of Holcus or not, the manual does not tell, but surely it is nowhere as brilliant a silvery pink-purple as it is here, and, perhaps, for the same reason it is known to the farmers as "Red Top." Down nearer the bog, Pogonia ophioglossoides filled the grass with its little pink buds, with here and there a few in bloom. Splendid Yellow Thistles, Cnicus horridulus, were scattered around, and, notwithstanding their repelling name, are very handsome, decorative things to look at, but at the same time very awe-inspiring to the plant-collector. They are scarcely more than two feet high, usually lower, with a rosette of long, very prickly leaves, spreading flat on the ground; most beautiful leaves, too, with a broad reddish or reddish-purple midvein and margin, each prickle purple, with a yellowish tip. The flowers are pale, creamy-yellow, with splendid royal purple involucres.

Creeping through the grass everywhere were the little white flowers and slender shoots of the Running Swamp Blackberry, Rubus hispidus, and the long branches of the Cranberry; but not a flower on the latter was to be seen, and nowhere in the swamp was a shrub in bloom. Here and there, all over the meadow, were fine clumps of the Flowering Fern, its rusty-brown fertile panicles towering above the tallest grass top and the shorter, paler green tufts of the Sensitive Fern. A slight stretch of the imagination will include in the meadow a waste strip of ground on the edge of the road, where the Lupin runs riot over the sand in long-stemmed, long-spiked masses of deep-blue Pea flowers. The contrast of the flowers against the yellow sand was very fine. The pod is also handsome, clothed with a long, fine down. Another prominent blue flower, but this one growing in the wettest part of the bog, is the little Blue Flag, Iris prismatica, a slender, graceful thing that at that time was abundant in every wet place.

The next day more Pogonias were in bloom, and here and there through the grass the Cranberry-buds were showing. The little Sundrops were more and more numerous, and rivaled the Buttercups in the brilliancy of their yellow. The species is that described in *Gray's Manual* as Œnothera fruticosa, var. humifusa, and is there accredited as growing only in Suffolk County, Long Island, and it is certainly very common here. It is, as its name implies, a low, spreading plant; its stems are somewhat woody, reddish, and, as well as the leaves and capsules, very puberulent, but the flowers are not by any means always small; some of them, when fully expanded, are over one and a quarter inches broad.

Careful search in a dry corner revealed the curious, delicate, little green Orchid, Twayblade, Liparis Lœselii. Never found in great numbers, it is a pleasant surprise to come upon a little colony hidden among the grasses. It has a stiff, perky, independent way of growing, with two broad glossy leaves and a delicate spike of thread-like flowers. Often, too, the previous year's dry capsule clings to the old bulb, which persists for quite a while.

A couple of days later the first Wild Rose, Rosa lucida, was seen; the tall, somewhat flesh-colored stems of Aletris farinosa were noted among the grass, and off among the rushes faint white gleams told of the Wool-grass, Eriophorum cyperinum, that was beginning to bloom.

Two more days, and on the 22d, the Pogonia flowers by the hundred extended as far as the eye could reach, growing sometimes out of the water. There were so many of them that their perfume, a curious mixture of violets and vanilla, pervaded the atmosphere. They are charming, dainty things, and have a contented way of growing up out of the Sphagnum without any visible means of support in the bulb line, like their near relatives, the Twayblade. Another Orchid, Calopogon pulchellus, the Pogonia's almost invariable companion, made its first appearance that day; it is taller, larger, bright magenta-purple, and very gaudy and self-assertive. There was only one of them in bloom, but little, round, greenish buds here and there at the top of slender flexuous stems told of many more to come.

The Arrow-wood, Viburnum dentatum, suddenly appeared in full bloom on the outskirts of the meadow, great flat cymes of snowy flowers that, unfortunately, were covered with that all-devouring pest in this region, the rose-bug.

Sunday, the 23d, was a dull day, and nothing new was noticed except that one Swamp Honeysuckle, Rhododendron viscosum, had ventured to put out a few blossoms. Everything else was doing its best to atone for the gray skies, and a marvelous sight they were, the rusty bog, with its fringes of bright green Ferns, dotted here and there with yellow Sundrops, the delicate purple grass in full bloom making a kind of iridescent veil over all the meadow, and above the great silvery mass of the old Willows against the leaden sky. A spell of wet weather followed, and when it was dry enough to penetrate into the meadow most of the Sisyrinchium had disappeared, and in the place of the little blue flowers were the many hundreds of small, hard, round, green capsules. The bloom of the Arrow-wood was also destroyed; many of the Red Clovers, Trifolium pratense, had turned brown; the Iris was fast shriveling, and the Wool-grass was very wet and bedraggled. The only things that had not suffered were the Pogonias, which, if possible, were larger, finer and more numerous than before. The Roses had come out, many of them, too, but mostly little dwarf things, only a few inches high in the meadow, where they were kept low by being cut down with the grass. Among the shrubbery the Black Alder, Ilex verticillata, showed its tiny round buds. They were scarcely larger than a common pin-head, but ready to bloom on the first sunny day. Both kinds are there—the staminate, with small sessile clusters; the fertile, with solitary little buds in the axils of the leaves. Here and there were the flexuous spikes of a Habenaria only six inches or so above the ground. The Star-grass, Aletris farinosa, was in bloom, an attractive plant, often found in sandy soil. It has a spreading rosette-like cluster of flat lanceolate leaves at the base on the ground and a solitary, tall, stiff stem with a wand of white flowers of the size and aspect of those of the Lily-of-the-valley at the top. The corolla is all crisped and wrinkled, and looks as if made of fine white paper crêpe, and just appearing at the top of the bell are six little orange-colored stamens. The yellow Loosestrife, Lysimachia stricta, made its first appearance that day, and the little sticky leaves of the Round-leaved Sundew, Drosera rotundifolia, were noticed in quantities riding on the top of the peat-moss.

A long week's rain ended the month, and on the last day the fog was too thick to see across the swamp, where the water stood deep in every depression, and the peat was as soft as a wet sponge, quite impassable, even to a weed-hunter. Once clear skies again, the July flowers will appear all the faster and be fresher and more brilliant for the good soaking they received in June.

East Hampton, L. I. *Anna Murray Vail.*

Foreign Correspondence.

London Letter.

An Experimental Fruit Farm was established last year at Woburn, in Bedfordshire, by the Duke of Bedford, with the object of extending our knowledge of fruit-culture, more especially in the county of Bedford, and, generally, all over England. It is believed that ignorance of the best kinds of fruit and of the best methods for their cultivation prevails among farmers and market-gardeners, to whom, therefore, this experimental farm will be a valuable guide. There can be no doubt that in Bedfordshire, as in most parts of England, first-rate fruit can be grown, but the obstacle to its cultivation is the difficulty of obtaining anything like profitable prices for it. In the pages of *The Gardeners' Chronicle*, last year, there was a lively and most interesting discussion of the question, Does fruit-growing pay in England? The well-known novelist, Mr. R. D. Blackmore, who is also well known in this country as a market-gardener, held that apples and pears at any rate could not be grown at a profit. On the other hand, others, chiefly nurserymen interested in the sale of fruit-trees, held that given good culture, the best sorts, and care in marketing, hardy fruit paid well. The Duke of Bedford's farm will not teach much more than any well-managed gentleman's orchard has taught all along, unless the cost of the whole concern is carefully kept and balanced against what the fruit realizes when sold in the open market. "Scientific farming," which has been persistently pelted at the heads of old-fashioned farmers here for the last ten or twelve years, does not appear to improve matters; indeed, I have heard of farms which have got into a sorry mess through being in the hands of so-called scientific farmers, who generally have fads or make experiments which end in failure. With a fair chance in his own market the English farmer and fruit-grower can hold his own against the best. At present, however, he has no chance, and his occupation will soon be gone.

Garden Hybrids.—The origin of some of our most popular garden-plants is here the subject of animated discussion in both scientific and practical journals, the garden Cineraria being the bone of contention just now. It is held, on the one hand, that originally—say sixty or seventy years ago—several species of Cineraria were crossed, and from their progeny the present race of Cinerarias has been evolved. On the other hand, it is contended that, although it may be true that hybrids were raised as stated, all the evidence of any value goes to show that C. cruenta, a tall purple-flowered species from the Canary Islands, is the sole progenitor of the dwarf, big-flowered, variously colored Cineraria which is now grown in every conservatory. All the essential characters of C. cruenta are present in the garden Cineraria, while of the other species said to be concerned in its origin no trace is discernible. The historical evidence is conflicting, and supports one view as well as the other. The scientific value of the problem is in the light it is likely to throw upon the causes and extent of variation of which plants are capable; its practical utility is in the assistance it will render to breeders of plants. In my view, hybridization has had little or nothing to do with the "improvements" of the horticulturist among plants that are annually or at short intervals propagated by means of seeds. Thus, such plants as Primula Sinensis, China Asters, Brompton Stocks, Gloxinias, the Turban Ranunculus and Cinerarias are each the descendants of one species only. I should like to hear of a case of a race of garden-plants of the character of those mentioned which was originated by true hybridization. Tuberous Begonias will occur to many as an example, but there are botanists who do not believe in the specific differences of the plants from which these have been bred. Streptocarpus is another case which will occur to others as the most recent case of hybridization having resulted in an "improved" and varied race of plants. But I know from experience that in a few generations the one or other parent in each case becomes entirely eliminated, and we get back to the species we started from. In other words, it is necessary to reintroduce the blood of the original parents into the seedlings to maintain variety and a mixture of characters. Of course, we have many beautiful races of garden-plants of quite respectable antiquity, and which are of true hybrid origin, such as Roses, Rhododendrons and Pelargoniums, but these are perpetuated by cuttings, grafts, etc., and not by means of seeds. To put the matter in the Darwin formula, slightly altered, Nature abhors hybrids, which, if not absolutely sterile, are so unstable that in a few generations the characters of one of the parents entirely disappear.

Finger and Toe Disease of Cabbages.—Mr. G. Massee, F.L.S. of the Royal Gardens, Kew, has published an interesting paper on this disease, also called "clubbing" and "anbury," which often destroys large crops of vegetables, upon the roots of which numerous nodules are formed, and these in a short time convert the whole root system into a slimy fœtid mass. The disease is caused by a minute organism related to fungi, and its name is Plasmodiophora brassicæ. Mr. Massee goes further than most vegetable pathologists, in not giving only the name of the disease but in showing that, as the result of actual experiment conducted by himself, the disease can be prevented and even cured by very simple means. His conclusions, given in the following extract from his paper, are:

1. That in addition to cultivated plants, several common weeds belonging to the order Cruciferæ are attacked by the Plasmodiophora. Hence the necessity for preventing the growth of such weeds in fields and hedge-banks.

2. That the germs of disease are present in soil that has produced a diseased crop, and retain their vitality for at least two years.

3. That the development of Plasmodiophora is favored by the presence of acids, and checked by the presence of alkalies, agreeing in this respect with the fungi rather than with bacteria.

4. For the purpose of sterilizing infected soil, experiments prove that either a dressing of lime or a manure containing potash salts is effective, the last being most valuable, as it not only destroys the germs in the soil, but also arrests the disease in seedling plants, and at the same time supplies one of the ingredients necessary for the healthy growth of turnips.

A National Cactus Society has been formed in England "for the scientific study of this most curious and beautiful family of plants and to foster a love for their cultivation." I am surprised to learn, from a circular published by the society, that there are 210 collectors and growers of Cacti in this country. It is intended to have exhibitions of the plants, to give lectures, and to publish an illustrated journal dealing exclusively with Cacti. The secretary of the society is Mr. E. B. Chapman, of Frome, who will be pleased to receive information of any kind relating to the introduction and cultivation of new and rare sorts. Judging by the number of catalogues and lists of Cacti received at Kew from the United States, there must be many to whom a knowledge of the existence of a Cactus society in England will be interesting. Fifty years ago Cacti were favorites with English amateurs.

London. *W. Watson.*

Plant Notes.

Rhododendron maximum.—This is the Great Laurel, which is found in low lands from Maine to Ohio, but is most abundant through the Alleghany region from New York to Georgia. It is one of the best of our hardy Rhododendrons, and indispensable to planters who look to the permanent improvement of their grounds. It is one of the best all-round shrubs in cultivation, and, perhaps, the very best of the broad-leaved evergreens which may be depended upon, after it is once established, for winter effects, since it is so hardy that it needs no protection. It is also one of our best flowering plants, the charming pinkish white flowers coming in the greatest abundance at this

time of the year, when most shrubs have passed out of bloom. These Rhododendrons are particularly good this year at Forest Hill Cemetery, Boston, and it needs but a short visit to these grounds to be convinced of the important place which they deserve in planting schemes of the best sort. The specimens here are large, well developed, well placed and sufficiently numerous to give one an idea of the great attractiveness of the plant, and how well it harmonizes with other native growths and with some kinds of exotics. All these plants need for their best development is first a deep soil, which should be as fine as possible, yellow loam apparently being quite as good as peat, and then, when well established, they should have plenty of water during the hot and dry July and August weather, and this water should be given in large quantities, and not in driblets. They do not require water frequently, but unless they stand where their roots are in ground permanently moist a sufficient amount should be given to thoroughly soak the soil. A mulch of leaves or clippings from the lawn is helpful, and some protection in winter is desirable for the first few years. The propagation is by seeds, but this should only be attempted by skilled gardeners. At the Arnold Arboretum many hundred seedlings have been grown during the last few years under glass and in frames, and after the first year the growth is very satisfactory. If small plants are obtainable, there is no great difficulty in establishing wild specimens procured from the woods and swamps. Any striking varieties which are found may be increased by grafting, using the improved veneer graft under glass during January or February. Stock is offered in limited quantities by most nurserymen. A wide field is offered for the hybridizer; it is curious that such a thoroughly good plant should not have received more attention in this direction.

LIGUSTRUM IBOTA.—This fine Privet was introduced from Japan in 1861 under the name of Ligustrum Amurense, but it is only within the last ten years or so that it has been used to any considerable extent in ornamental planting. Even now it is not as frequently planted as it should be, but the fine clumps in the Arnold Arboretum are so attractive that they invite the attention of all who desire to increase the diversity of their plantations. This plant is a shrub growing some fifteen feet high, of compact and symmetrical habits, good foliage, and covered with numerous small white flowers, borne in short terminal spikes, which open late in June, after most shrubs have passed out of flower. It succeeds in any good soil, and the form which is planted in the Arboretum seems perfectly hardy in somewhat exposed situations. The propagation is by seeds, by hardwood cuttings or by cuttings of the growing wood struck under glass in June; it is apparently as easily handled as any of the better-known Privets. Although the type of this plant which is grown at the Arboretum is perfectly hardy, there are other forms, sometimes obtained from foreign nurserymen, which do not succeed in our climate; they are apt, in trying seasons, to winter-kill—that is, the tops die to the ground, but the roots survive and make a good growth; these annual growths, however, do not produce any flowers, and so one of the great charms of the shrub is lacking.

Fig. 40.—Forests on the Thompson River, British Columbia.—See page 282.

ŒNOTHERA MISSOURIENSIS.—This is one of the best of the Evening Primroses, and is a most desirable plant for the herbaceous border. It is low and spreading, the leaves are long and narrow, the flowers are yellow, measuring three inches or more in diameter and are produced in abundance from June to August. The plant is hardy and requires no protection in ordinary situations. Its cultural requirements are simple, a fairly well-drained soil and

plenty of manure, with a slight covering of Pine-needles during the winter. The propagation is by seeds, which may be sown in March under glass, under which practice flowering plants can be had the following summer. Plants so obtained are good for several years, but the time comes when they deteriorate, and they should then be thrown away and new stock should be procured. Œnothera taraxacifolia very much resembles the Œ. Missouriensis in habit of growth and bears white flowers, which become pink as they fade. The two make good companions in the border. The plant is, however, not so hardy as the Missouri Primrose, and to insure success it is well to start new plants every year. Seeds sowed under glass in March will make good blooming plants the following summer. In some gardens both these Primroses propagate themselves by self-sown seeds.

Spiræa palmata.—This Japanese Spiræa is one of the most effective herbaceous plants in bloom. Its perfect hardiness, without any protection, its good habit, bright-colored flowers and clean foliage make it a desirable plant for any garden. Nevertheless, with all these good qualities, we rarely see a first-rate specimen. Some excellent plants are now flowering in the Botanic Garden at Cambridge, and Mr. Cameron writes that the plants were small when received a few years ago. They were set in a rich soil, where they grew rapidly, and now measure a yard across. The part of the rock-garden where these Spiræas are placed is moist, and they are partially shaded by a large Magnolia acuminata. They will grow three feet high in such a location, or in good open garden-soil where they can find abundant water. In thin dry soils they will attain a height of little more than a foot, and much of their effectiveness is lost. They appear well near open water, and they never grow more thriftily and are never seen to better advantage than on the margin of a lake, especially if they can have partial shade. The flowers, which are borne in large corymbose panicles, are bright rosy crimson in color, and the palmate leaves are six inches across on plants which are well treated. S. palmata is readily increased by division either in spring or fall.

Cultural Department.

American Irises.

AMERICAN IRISES do not seem to have received the attention from cultivators that they deserve. It is doubtful if there be at this time a complete collection even of the different species in any one garden, while there are, no doubt, good varieties which have never been cultivated, and probably not even collected for herbariums. Again, there are varieties which have only a local reputation and which have not been generally distributed. I have found a number of varieties of this kind; some of these are not yet flowered here. Some of our Irises are most difficult to establish, and it will task the skill of an eastern grower to flower some of the west coast species, which resent removal and naturally are at rest during our summer season.

We have a trio of beautiful dwarf Irises in I. cristata, I. lacustris and I. verna, of which the first two belong to the crested section, or Evansia of the botanist. Of these, I. cristata (I. odorata, Pers.) is the prettiest and usually most amenable to cultivation. It increases rapidly if the short creeping rhizomes are planted in moist, light rich earth, though, on the contrary, it will grow vigorously on a rockery, where, however, it is likely to be injured during a hard winter. When covered in the spring with its light-mauve colored flowers, nothing could be prettier. I. lacustris has the habit of I. cristata and purple flowers with a yellow crest. It grows on the shores of the great lakes, where it is very plentiful. It thrives in cultivation in a moist soil, but is rather shy in showing its flowers.

Iris verna is a member of the subgenus (Pardanthopsia), of which there are only four species, the others being very rare. It has short creeping root-stalks, narrow, taller leaves, and no crest. Its flowers are dark rich purple, with yellow markings. It is a plant not uniformly happy in gardens, but not a difficult subject. Every one knows the common Flag of our eastern states, I. versicolor (I. picta and I. sativa, Miller), a plant which thrives equally well in brackish, marshy, fresh-water swamps, or perfectly dry ground, and may be depended upon to hold its own under very adverse conditions. I have never seen any variations from the type, but Baker notes a variety, I. Virginica (I. caurina, Herb.) and I. placcida, Spach., as forms with some varieties of structure and coloring. I have also noticed in foreign catalogues other names as I. versicolor Krameri. It seems to me useful to note synonyms as warnings against accumulation of plants whose names in catalogues are often so many traps for the unwary. Some dealers even offer the same plants under different names at different prices. Our other common Iris, which is often nearly as thickly sown as grass in a meadow, is I. prismatica (I. Virginica, Gray; I. gracilis, Bigelow; I. Boltoniana, B. & S.). With its narrow leaves, a foot or more high, and purple flowers, this is a species which is graceful in habit and effect. Allied to I. versicolor, though a separate species and a distinct garden-plant, is I. Caroliniana, which was discovered a few years since by W. A. Manda in North Carolina. This has somewhat flexulous leaves, very slightly glaucous, brownish spathe valves and light lavender flowers of fine form. Farther south, on the Atlantic coast, is found another beardless Iris, I. tripetala (or I. tridentata of Pursh). This is interesting to the botanist, as having smaller standards than any of the narrow-leaved kinds of this section (Apogon). It is an attractive dwarf-growing purple Iris, flowering late in the season. While it is hardy here, it does not seem quite satisfied with our winter climate. After worrying most of the collectors on the coast, I succeeded in securing this from Florida. It is a plant in request among Iris fanciers, and scarcely to be had true from the dealers, who confound it with I. Hookeri (or I. tripetala and I. tridentata, of Hooker), which is a Canadian Iris with the habit of I. versicolor. Another southern Iris is I. fulva (or I. cuprea), with flowers distinct in color from any other species of the family, and of a spreading Morœa-like form when open. The form usually in cultivation has flowers of a rather dull coppery brown, but lately *Meehans' Monthly* figured, in a colored plate, a form with much brighter coloration in pinks and browns, so that there are evidently variations of this plant to be found. Beyond the Mississippi to the Rockies, we seem to have only one species, I. hexagona, though this is found also in the southern states as far east as Florida.

No Iris has given me greater pleasure this year than I. hexagona, var. La Mance, which was discovered last season in Benton County, Arkansas, and has been named in honor of Mrs. L. S. La Mance, the discoverer. This is much superior to the type, and has slightly pendulous leaves an inch or more wide and two feet high. The stems are spreading, leafy and bear several two to three flowered spathes. The flowers are large, with standards and falls both spreading and of a rich blue-purple, shading to white. The styles are light green. The plant in flower is very distinct in habit and most effective and striking. Besides the type, I have also an unflowered variety with flowers of a lighter hue. A friend in Florida has sent me a native form of I. hexagona, with white flowers. This rarity should be a great gain, white Irises being the quintessence of floral beauty. I. hexagona makes wonderful rhizomes, nearly round, an inch and a half in diameter and sometimes two feet long. Naturally it requires good lateral root-room and good supplies of moisture. Westward again, there is said by Coulter to be only one species in the Rocky Mountain basin, I. Missouriensis (I. Tolmieana). This is a narrow-leaved kind, with light purple flowers, the falls of which are reticulated. The flowers are small, but it is a vigorous species and rather attractive. Westward again we find a number of species and varieties, which, in a gardening point of view, form an interesting group. The list comprises I. tenax, I. tenuis, I. macrosiphon and varieties, I. Hartwegii, I. Douglasiana and varieties (I. Beecheyana, I. Santa Cruz, etc.), I. bracteata, I. longipetala and varieties.

Iris tenax, a linear-leaved species from Oregon and northward, offers no difficulty in cultivation here and flowers regularly, without special attention, early in the season. Its rather small light purple flowers are attractive. I. tenuis, figured in Garden and Forest, vol. i., page 7, I have not been able to secure, and shall be glad if some reader in Oregon would favor me with seed. Judging by its habit, it is probably a plant difficult to establish. I. Macrosiphon and I. Hartwegii I am growing from seed, having failed to establish them otherwise, though I have been favored with numerous apparently strong plants by Mr. Purdy and others. I. macrosiphon is said to be very handsome and free-flowered, ranging in color from yellow through the whites and purples. Mr. Purdy has transplanted this successfully to his garden on the Coast Range,

but, of course, his climate is not an eastern one, and the plants rest and grow under somewhat normal conditions. Herr Leichtlin has lately reintroduced I. macrosiphon to cultivation from seedlings, and we are likely to hear more of it.

Iris Hartwegii was first specially called to my attention a few years ago by an English friend, who is one of the best of amateur gardeners. He had once had it established, but had lost it, much to his regret. There may be others outside of California who have established it, but probably not many. The friend who sent me some plants this spring says: "Remember that they require a dry locality. They never drink a drop of rain from the middle of May till the end of September at the earliest, and they are to be found only on those hillsides where they are drained to perfection; never near a moist or wet spot. I do not recollect having found them on any but dry slopes, and there strong in the sun, and slim and thin if shaded too thickly by Pines, Pinus ponderosa." Strong roots and thin roots have mostly gone quickly to the majority in my garden, though at present there are some survivors under cover and dormant, besides seedlings. It will be seen that such plants are likely to cause a gardener some trouble. If we are to grow some of the California and many of the Asiatic plants it will be necessary to arrange a summer drought for parts of the garden. There is also another little matter which bothers a gardener in growing some of the early-flowering plants—our seasons are sometimes so late that the plants do not move until their natural flowering season is over, and this is apparently prejudicial to their perfection. There is a great difference in the temperature required to start perfectly hardy plants, for a plant may be perfectly hardy and yet require quite a warm temperature to start it into vigor, Bamboos, for instance, being a case in point. Romneya Coulteri, which is a true Californian, did not appear this year till the first of May, about the time it should be in flower, and it will probably not catch up. I. Douglasiana has several varieties, and Mr. Purdy informs me that he has seen some beautiful natural hybrids with some other species. Of these and I. bracteata, figured in GARDEN AND FOREST, vol. i., page 43, I have had little experience beyond losing them one or more times. I. longipetala is a species which seemingly requires no special treatment, and has grown here for some years with so little attention that I do not at the moment remember the distinguishing features of its purple flowers.

This seems to complete the list of known American Irises, except I. setosa (I. brachycuspis), which is found in Alaska, and is possibly an escape from Asia, where it is said to be rather common.

These notes, which, perhaps, give a large proportion of negative information, are offered in the hope that observers of our native flora may be induced to notice and collect Irises which may differ from the types, and favor us with notes on the natural habitats of some of the little-known species.

Elizabeth, N. J. *T. N. Gerard.*

Midsummer Care of Chrysanthemums.

SPECIMEN plants of Chrysanthemums are now making vigorous growth. It is important at this time, more than any other, that an even and compact growth be secured; hence careful stopping is one of the most important operations. Every day the plants should be looked over, and any shoots making unusual headway nipped off. This work may be continued until early in August with most varieties, and even later, when an occasional shoot strikes out above the rest, as will sometimes happen with G. W. Childs, Octavie Mirabeau, Portia and Iora. The Louis Boehmer type, Ivory and varieties generally of slender growth are better if they are allowed to mature their growth early, so that stopping may be discontinued about the middle of the month. Experience, however, is the most reliable guide, and to note each individual variety in this particular would be tedious work.

In point of size, our specimens in July are never in any way remarkable, and we are often warned that at exhibition time we shall be behind. Our aim has not been to have our plants make unusual growth, but rather to develop a good foundation. To this end we have never used very rich soil, as heavy growth early in the season tends to an abnormal root development, and increases the difficulties as well as the dangers of feeding or applying stimulants later on. To put it plainly, the plants are surfeited, to begin with. A loss of leaves will be sure to follow, and without good foliage we cannot have good flowers, neither can we make a finished specimen.

Skill lies rather in the application of stimulants than in their choice. General lines of work may be laid down, but each must to a considerable extent experiment for himself. There are plenty of good compounds to choose from. As stated in previous notes, enough room should be left, when making the final shift, to allow for a top-dressing of good soil manure of some kind, or whatever is decided upon for a fertilizer. We apply a top-dressing before we find it necessary to use stimulants in the liquid form. For this purpose, cow-manure is good, but it must not be applied green. In this condition, it would quickly close the pores of the soil and shut out air, so essential to healthy development, when stagnation would result. This is generally shown by the leaves becoming yellow. Cow-manure should be dried and put on rough and allowed to remain so. We do not, however, use it, for the reason that it is bulky and does not contain enough concentrated food. Sheep-manure is excellent, but this also is objectionable for use in pots, on account of its bulk, though to a lesser degree than cow-manure. Partiality may be charged in recommending one artificial manure above another, but I must say that Clay's fertilizer is by far the best and safest of any I know, and I can fully attest to its lasting qualities. One part in fifty, or even more, can be incorporated into some good loam, with a dash of sand to keep it from forming a compact surface; this makes an excellent first top-dressing. Enough may be used to make a covering of about one-fourth of an inch. The effect of this compost will be seen in a few days. I have already tested a plant of Ivory, which, by comparison with the rest, shows increased vigor and improved color. Guano may be used in the same way in smaller proportions, but it is dangerous, and owing to the uncertain strength of the article under that name now in commerce it is unreliable.

Later on liquid-manure can be used. Drainage from barns is one of the best fertilizers known, containing in a concentrated form all the ingredients of a complete plant-food. One part in twenty gallons of water is a good proportion to use, applied two or three times a week. The plants must be healthy; a sickly plant would not be benefited, but rather injured. Plants in this condition are either constitutionally weak or else there is a defect in the drainage, and the roots should be examined. Bituminous soot, put into a bag, with some device for filtering water through it, is beneficial, often giving a healthy tone to a weak plant when all other remedies fail. An overdose of stimulants is sure to occur where a large quantity of plants are grown. Where this occurs it is better to leave such plants rather dry until the air has had a chance to work through the soil with deodorizing effects. Water should be continued sparingly, for, since the trouble is root-injury, some time must elapse before normal root-action sets in.

Insect pests must be fought continuously. Fumigation for most of the aphis family is usually sufficient, but not effective enough for black and yellow thrips. A decoction of three pounds of tobacco-leaf in twenty gallons of water, with an ounce of sulphide of potassium dissolved, and a tablespoonful of kerosene-oil to a pailful of water on application, has proved effective.

Plants intended for specimen blooms are now making good growth, and will soon need staking. The July crown-buds are showing quite numerously, and, except when appearing late in the month on some early varieties, which are good on this bud only, notably Mrs. E. G. Hill, all should be discarded, and the terminal bud allowed to grow.

Wellesley, Mass. *T. D. Hatfield.*

Some Showy Perennials.

THE native Pentstemons are beautiful plants, but many of them are hard to cultivate. Young plants are easily raised from seed, and if this is sown early in spring some of the seedlings will bloom the first summer or autumn. Somehow, many of the species never seem to grow so well here the second year. Even when they are kept in a cool frame during the winter and are planted out in the spring, or if they are left in the border and protected, they start to grow so weakly in the spring that they make a poor display in the summer. However, we have a number of showy species that are quite happy here, and they greatly help to adorn our beds and borders. P. barbatus makes an attractive plant when in bloom. It is one of the most robust growers, and makes itself at home in almost any kind of soil or situation. It grows in tufts, and from those tufts rise slender wand-like stems with lanceolate pale green leaves, and the light pink drooping flowers are borne in long loose panicles. The flower-stems are produced plentifully, and the plants are attractive for a number of weeks. There are several varieties of this species, but the best one is Torreyi. It is a robust plant, growing taller and stronger than the type, and bears beautiful deep scarlet-red flowers. The

species is found growing wild in the mountains of Colorado and New Mexico, and the above variety is found on the western border of Texas to Colorado and New Mexico. P. ovatus grows nicely here, and has open panicles of pretty blue flowers. It is about two feet high and has ovate toothed leaves. P. lævigatus, var. digitalis, makes a desirable plant for the garden. In the third row from the front of the mixed border it grows vigorously. We have also a large bed in the rock-garden, where the plants are pretty well shaded during the hottest part of the day. In such a position the flowers have lasted longer and the plants look as healthy as if they stood in a sunny situation. This is a strong plant with an upright habit and large lanceolate leaves. The compact panicles of whitish flowers are showy, and last for several weeks in good condition on the plants. P. diffusus is a half-shrubby species, with a constitution able to stand our severest winters. The color of its flowers is violet-purple, and they are produced annually in great abundance. Its height is two or three feet, and it makes a good border-plant in an open position and rich soil. P. pubescens, though not as showy as some of the species, thrives here, and when well grown it makes a neat small bush a foot or more high, with dull violet flowers. P. confertus is a low-growing plant with sulphur-colored flowers, which does well in the front row of the herbaceous border.

Last year I gave some testimony as to the hardiness of Alströmeria aurantiaca, but this year I have been disappointed with it. Plants that had been established in the rock-garden for two years, and which I thought were perfectly hardy, were all winter-killed, and not even one stem appeared above the ground last spring. The question which now suggests itself is, when can we call a plant hardy? The lovely Anemone Japonica and its white variety have been grown here successfully for the last seven or eight years, but last winter was very severe upon them and very few of them were alive in the spring. Although the plants were killed last winter, yet we must not say they are not hardy, because many of our native plants were hurt with the severeness of the weather. The experience of last winter has taught us a lesson to be always careful with plants that are of doubtful hardiness, and to give them the very best position that can be obtained for them. Perhaps the reason why the Alströmeria died was because it was planted where the water at one time last winter lodged around its tuberous roots. It must be remembered that this plant likes a deep, rich sandy soil and a position where its roots will be dry in the winter. We have a large plant in bloom now that has not been disturbed for the last six years. It measures four feet across, but it would have covered much more space if it had been allowed to grow. It has to be checked or it would smother its nearest neighbors which are of a less aggressive character. The plant grows on the north side of a hedge, where it is covered heavily with leaves in the winter, and a shutter is laid upon the leaves. Perhaps the reason why this plant survived the winter is because the shutter helped to keep the moisture away from the roots when they were dormant. This Alströmeria is a herbaceous, tuberous-rooted perennial from Chili. It has erect stems clothed with linear-lanceolate, glaucous green leaves, which are curiously twisted at the base. The showy flowers are of a bright orange color and are produced in the form of a terminal umbel. The plants blossom for several weeks, and well-established specimens produce large heads of flowers, which are greatly admired.

Harvard Botanic Garden. *R. Cameron.*

Three Good Plants.

Clerodendron squamatum.—A plant of this semi-shrubby Clerodendron, recently obtained from Japan, proves to be valuable for pot culture. It is not commonly seen in cultivation and is a native of China. The foliage is large and handsome, resembling very much that of the Catalpa, the growth being perfectly erect, with terminal heads of brilliant scarlet flowers. The flowers and the calyx are alike in color, so that the flower-cluster is attractive before any of the flowers have expanded. The plant is fond of sunlight. It was grown in an unshaded house during all the hot weather we had early in the season. It would be likely to make a fine subject for planting outdoors in the extreme south and also in California. When the specimen was obtained we were under the impression that it was the plant known under this name some fifteen years ago, which was a climber requiring a warm house and bearing bright red flower-heads in the middle of winter, with rich dark green shining foliage. That plant was evidently misnamed. I should be glad if Mr. Watson could tell me if there is still such a plant in cultivation in England or elsewhere. It would be a valuable winter-flowering climber for a warm house could it be obtained.

Hæmanthus Kalbreyerii.—Though not a new plant, this seems to have been reintroduced into cultivation during recent years in quantity, and it has been possible to obtain this, the best of the Blood-flowers, at a reasonable price. We find that there is no difficulty in growing and flowering it if treated the same as other summer bulbs that are grown in the greenhouse. Ours were obtained last fall and placed in dry soil until spring, when signs of growth commenced. We were soon rewarded with flower-spikes, not so strong as they will be after good cultivation for a year or two, but the plants are growing vigorously in a warm, half-shaded position in the greenhouse, and we hope to have good strong spikes next year. We used to have Hæmanthus puniceus, and flowered it several times, but it is not worth the space it occupied in the greenhouse. The flower-stem was short, and the head of flowers not spherical like that of H. Kalbreyerii, which is the best of the genus, and worthy a place in any greenhouse where things a little out of the common are appreciated. In *Nicholson's Dictionary* the height of the plant is given as six inches; this is misleading, for our plants are now about three times that height and still growing. The flower-stems are produced when the plant is about a foot high, and the stems are equal in height to the foliage. This species is a native of tropical Africa.

Crinum Kircape.—Through the kindness of Mr. T. L. Mead, of Oveido, Florida, I have a fine plant of his new hybrid Crinum now in bloom. It is a cross between C. Kirkii, a species from Zanzibar, and C. Capense, from south Africa. This is one of the interesting results of the work of this careful hybridist. From the bulb sent me last winter we have already had three strong flower-spikes, each bearing about a dozen sweet-scented white flowers with a decided rose-colored stripe down the outside of each petal. The plant has been in continual bloom from the time the first flower opened, one flower-stem coming after the other in quick succession, and the plant has been in the dwelling-house for some time. I am not aware that any attempt has been made before to hybridize with these Crinums. I have raised seedlings myself from C. Capense, and flowered them, but in Florida, where they are hardy and need no special care in winter, they must be beautiful in summer. Mr. Mead has given the plant a compound name, in accordance with the custom now often adopted with the hybrid progeny of Orchids. If, as I believe, the cross has not been made before, there seems no reason why the name is not a good one. In general appearance the plant resembles C. Kirkii more than C. Capense (C. longifolium). The latter parent should, however, give the plant hardiness. The species is commonly grown out-of-doors in Great Britain, and is generally hardy in favorable locations. It would doubtless be hardy in many states besides Florida with a little winter protection.

South Lancaster, Mass. *E. O. Orpet.*

Strawberries.—Some novices in Strawberry-growing, who are investigating the value of different varieties, should be advised that some of the very best are the poorest unless they are highly cultivated. Among the recent varieties, Beverly and Barton are about worthless if they are grown like Cumberland, which, as is well known, will endure neglect better than most sorts. Yale is worse than a weed if it does not have particularly good culture, but is a fine variety if highly fed and well worked. In selecting varieties look for those which make a strong plant-growth, as those which give inferior foliage must, in the long run, be discarded. Marshall and Brandywine are strong growers among the native kinds. Haverland, also a heavy producer on mediumly strong soil, has weak stems and does not lift its berries off the ground.

Clinton, N. Y. *E. P. P.*

Correspondence.

Stones, as a Source of Fertility.

To the Editor of Garden and Forest:

Sir,—Our soils, at least in north-eastern America, are the product of glacial action. I am myself living upon a great moraine, where once was a vast glacier, which dug out and formed the bed of Lake Memphremagog and its tributary valleys. The marks of glacial action are all about me upon my farm, two miles from the lake, and about five hundred feet above its surface—that surface being itself eight hundred feet above sea-level. After the great glacier disappeared, or while it was in the course of dissolution, vegetation sprang up, and soils were gradually formed by the conjoined influ-

ences of water, frost and vegetation. It is to the part which vegetation then took in this work, and has ever since been taking to this day, that I wish in this article to call attention. This farm is in every characteristic distinct from another, upon the shore of the lake, which I have owned for nearly thirty years, and which consists, down to and below the water-level, of fine gravel and sand. This was covered, when the country was opened, less than a century since, with a heavy growth of mammoth Pines, some of which were of almost incredible girth and height. It is now divided into fine level farms, extending back about a mile from the water. Then begins an ascent of two miles to another plateau, extending for some ten to fifteen miles, gradually and then more rapidly rising to the watershed between the Memphremagog basin and the valley of the Connecticut River. It is upon this first bench that the farm first referred to is situated.

It appears, on a mere surface examination, to consist of a soil nearly as light, as regards its finer constituents, as the lake shore territory, but encumbered with stones of all sizes, from coarse gravel to large bowlders, most of the latter having been removed in the sixty or more years since the farm was first opened. The slope toward the west is moderate, offering a magnificent outlook, not only toward the grand range of the Green Mountains, but to all points of the compass. This farm has passed through many hands, but has never been unoccupied; and it has had the reputation of being "a good farm to a good farmer." I bought it because the winter range of the thermometer at this elevation is not so low by several degrees as near the lake, the cold air "settling down" into the lowlands. This difference is shown by the fact that the Tolman Sweet Apple, while a failure by the lake, succeeds well at this elevation; and this is the case with many other of the almost hardy varieties, making it particularly valuable to a fruit-grower. But, besides this, it is particularly interesting as affording an opportunity to study the formation of soils—a subject which has interested me greatly, almost from my boyhood.

Many, very many loads of loose stones have been carted off from this farm, and it is now in good condition for the use of all farm machinery; but the peculiar thing about it is that, so far as it has been examined, it appears to be underlaid by a stratum of clay of unknown thickness. This clay seems to be almost free from small stones, though containing many water or ice worn bowlders of the same character with those found upon the surface. Many of these are of granite, but some are of softer rock, approaching to slate, and some of these are of easy cleavage. On these I have long noticed the appearance of corrosion by the solvent action of the roots of trees and plants; and this has led me to the conclusion that this erosive action has a good deal to do with the formation of soils and the maintenance of their fertility. I believe that tillage and the application of manurial matter tends to increase this action, and that in this way we get a double influence, tending to the improvement of the soil.

As to the actual disintegration of stones by the roots of trees and of smaller vegetation, I think no observing person can doubt the fact when his attention is directly called to it. The lines of corrosion can be seen in thousands of instances on mossy stones, even of granite, though more distinctly on slates and limestones. Careful removal of the moss will reveal the fine roots lying shallowly, but plainly, in the minute creases which they have made. It is not the moss alone which thus erodes the stones; other vegetation has the same action. Chemical analysis reveals the presence of mineral matter as an organized constituent of plant tissues. On the death of these plants this mineral matter which they have taken up is relegated to the soil, and constitutes the mineral plant-food for succeeding generations of plants. Thus our farm-lands are being, so to speak, renovated—or, as farmers are wont to say, "rested"—by lying fallow.

It seems to me that this action of plant-roots in preparing their own mineral nutriment has not had due weight given to it by writers on agriculture. It acts in coöperation with the solvent operation of the water of the soil to render the mineral elements available, and thus we may say that plants devour rocks and turn stones into bread!

Newport, Vt. *T. H. Hoskins.*

[It is well known that most soils are made up of minute fragments of rock which have been pulverized and decomposed, and the texture and fertility of a given soil may be often known from the constitution of the original rock from which it was made. Besides the well-known wearing action of water and air, the chemical action of substances dissolved in the water and the disruptive power of ice, dead vegetable matter and living roots are both recognized as disintegrating forces. Certain substances, generated by the fermentation and decay of plants, help to soften rocks with which they come in contact, and it is often noticed that the surface of a rock under living lichens can be scraped away when the bare surface of the same rock remains hard. There are acids in the juices of plants which have a solvent power on rock, and that the root-hairs of other plants have a similar effect is proved by the common experiment of sowing seed in sand which is placed on a marble slab. After the seedling has started, the roots adhere to the slab and eat into it, so as to leave their impression visibly upon it when the roots are removed. If we include the action of tree-roots which helps to split open rocks, the great mass of vegetation in the soil during a period of years will be an important factor in converting stones into soil, but, of course, it is impossible to estimate just to what extent they are effective in this work.—ED.]

Recent Publications.

Ten New England Blossoms, and their Insect Visitors. By Clarence Moores Weed. Boston and New York: Houghton, Mifflin & Co.

This little book differs from many of the popular treatises which have to do with flowers, some of which are mere rhapsodies, consisting mainly of exclamation points and adjectives in the superlative degree, with no intelligible or continuous purpose. Mr. Weed, fortunately, has some accurate knowledge of his subject, and he has formed a distinct and coherent plan of treatment. In the first place, it is not devoted to descriptive botany, and it does not aim, primarily, to describe the forms and colors of flowers, nor to count and measure their different organs, but it is devoted to the one purpose of showing how these ten well-known flowers have adapted themselves to the wants of their visitors and how the structure of the visitors has been developed to help on the reproductive processes of their hosts. Of course, the little book makes no pretense of originality, but a very careful selection of flowers has been made to illustrate how odor and color catch the attention of the wandering insect and advertise the fact that nectar and pollen can be had for the taking. The structure of each flower, so far as this is related to the act of pollination, is given and figured, and the bees and moths and butterflies and other insects which accept this invitation are in like manner described. In an easy and generally pleasing style all the devices of the plant and the organs of the insect which coöperate to insure the gathering of pollen from the stamens of one flower and transporting it to the stigma of another flower and fastening it there are clearly explained, and to young and receptive minds this revelation cannot but be a stimulus to further study. For the value of the book does not rest altogether on the array of facts set forth, but rather in helping to stir the spirit of original discovery in every one who has the privilege of watching flowers and insects and noting the relation between the two. Of course, it is necessary to use scientific terms in treating such a subject, but in a few cases we think Mr. Weed has been needlessly technical, as, where he says, for example, "this Mayflower at Hanover is tending toward a more perfect dicœcism." This is a question of judgment, however, and in the main there is nothing repellent in the language, and any bright boy or girl can follow the argument without difficulty. Altogether, it is one of the most successful attempts to set forth in a popular way some reasons why the organs of plants have assumed their present form and texture and covering, and how nicely the habit and structure of their insect visitors are adjusted so that plant and insect coöperate to meet each other's needs. The book is well illustrated and clearly printed, and it can be commended to any inquisitive child, be he younger or older, whose attention has not been directed to this striking example of structural correlation.

Notes.

Large quantities of the dark red fruits of Prunus Simoni reached the eastern market in excellent condition during the first weeks of July from California, and have appeared on the fruit-stands as apple plums, an appropriate name, as they resemble in shape and color some of the small autumn apples, while the flavor also suggests an apple. The fruit of this curious Chinese tree, which is intermediate between the Plum and the Apricot in its characters, apparently travels well, and as it ripens early promises to be a good addition to our early summer stone fruits.

A Pennsylvania farmers' club has been testing the amount of shrinkage by weight of Indian corn which is kept over the winter. The results coincide generally with what has already been reported from tests made at the experiment stations. Between husking-time and the first of June corn will lose about one-sixth of its weight, and allowing for other losses and expenses it was agreed that it would be as profitable to accept forty cents for a bushel of corn in the ear at husking-time, as it would be to receive fifty cents for the same amount on the first of June or thereabouts.

Growers of English walnuts in California are complaining of a disease which appears as a black spot at the apex of the nut. Some fungus or insect seems to destroy the tissues of the nut-hull, and after this rind is penetrated it is supposed that a bacillus enters and disorganizes the tissue next to the nut proper. An agent of the Department of Agriculture has been studying the disease and recommends the winter spraying of the affected trees with Bordeaux mixture, although he confesses that this treatment is suggested only as an experiment, for the cause of the disease has not yet been satisfactorily worked out.

The Butterfly-weed, Asclepias tuberosa, may well stand as a representative plant of our hot dry midsummers. In sterile sand or the open gravel of thirsty uplands, where other plants can hardly exist, its flowers are resplendent with a vivid orange which approaches red in some individuals, and pales toward yellow in others, those which chance to become established in rich or moist ground showing usually the most red. There are places in the garden border where these brilliant flowers can be effectively used, but, after all, they never make so strong an appeal to the eye or to the imagination elsewhere as they do when glowing on some parched and lonely hillside.

The Wisconsin red oak has for several years taken high rank in furniture and finishing factories on account of its softness, adaptability to shop work, its lively color and figure. When plain-sawed it commands higher prices than any oak, although quarter-sawed white oak is more expensive. According to *The North-western Lumberman*, this Red Oak belt in Wisconsin is not wide, and at the rate the timber is being cut off it probably will not last more than six or seven years. In the north-west part of the state, which is not yet opened up by railroads, there is a heavily timbered area which may contain much Red Oak, but it will soon be traversed by a railway from Duluth.

The latest issue of the *Revue Horticole* to reach us contains a colored plate of the curious and beautiful Lotus peliorhynchus, an exceedingly rare plant of the Canary Islands, where it grows exclusively on Teneriffe on rocky cliffs of the ravine of Tamadava. The curious bright red flowers, hooked like the beak of a parrot, recall in general aspect those of an Erythrina or a Dianthus, rather than the flowers of a Lotus. Like many other plants of dry regions, it does not adapt itself particularly well to greenhouse cultivation, but will doubtless prove to be an admirable plant for southern California, where it may be expected to find the conditions necessary to develop its long, slender, graceful branches and brilliant flowers.

An enterprising farmer in Simsbury, Connecticut, turned the course of a brook on his place through a canal six feet wide along the slope of a hill, and placing a hydraulic ram seven or eight feet below the extremity of the canal he forced the water sixty-five feet upward through a three-inch pipe into a pond which held 300,000 gallons. This pond he made by throwing up an embankment in a well-selected spot on the hillside. Having bought three hundred and fifty feet of damaged fire-hose at fifteen cents a foot and adjusting a large sprinkler at the end he was ready to irrigate his Strawberry patch. According to the *Rural New Yorker*, a student from the Storrs Agricultural School was detailed to watch this irrigating scheme, and the result was that plants in the watered rows yielded considerably more than twice as many pounds of berries, which were larger, brighter and more attractive than the fruit on unwatered rows, and they were in great demand at high prices when ordinary berries could hardly be disposed of at all.

Bulletin No. 4 of the South Dakota Agricultural College and Experiment Station contains a list of the native trees and shrubs of South Dakota, by Professor Thomas A. Williams, botanist and entomologist of the station. One hundred and seventeen species of woody plants are included in this report; of these thirty-seven are trees, seventy-four are shrubs and six are woody climbers. The region is interesting from the fact that it is the meeting-ground of representatives of the eastern and western floras, the eastern Hop Hornbeam, for example, Ostrya Virginiana, being abundant in the Black Hills and in the north-eastern part of the state, while the Yellow Pine, Pinus ponderosa, of the west, is the common and only species in the same region. The arborescent vegetation, however, is rather eastern than western, as among the thirty-seven trees, in addition to the Pine, we find only the following inhabitants of the Pacific forests: Populus angustifolia, the Narrow-leaved Poplar of the Rocky Mountains; Salix flavescens, a species widely scattered all over western America and found in the Black Hills in a shrubby form; Betula occidentalis, Cercocarpus parvifolius and Acer glabrum. The other species belong either exclusively to the eastern flora, or, like Juniperus Virginiana, Betula papyracea and Picea Canadensis, range across the continent.

In the July issue of *The Botanical Magazine*, Sir Joseph Hooker describes Pyrus cratægifolia, a small bushy tree which grows spontaneously in woods near Florence, Bologna and Lucca, and in a few other localities in northern Italy. Its nearest ally appears to be P. terminalis, from which it differs in the more cordate base of the leaves, which are incisely serrate and tomentose on the lower surface, and in its simple terminal corymbs of long-stalked flowers and in the small ellipsoidal red fruit. It is the P. Florentina, Mespilus Florentina and the Cratægus Florentina of some authors, and appears to be an exceedingly rare plant, both in its native country and in cultivation. So far as we know, this pretty and graceful species has not yet been introduced into the United States. Among other plants of horticultural interest figured in this issue are Rubus lasiostylus, a Chinese Raspberry, from central China, where it was discovered in 1888 by Dr. Augustine Henry, and Senecio Hualtata, one of the group of gigantic herbaceous Ragworts, natives of extra-tropical South America. It is a tall stout herb with a towering stem five feet high and great radicle leaves, sometimes eighteen inches long and from four to six inches broad, and a pyramidal panicle of crowded clusters of pale primrose-colored flowers. At Kew, where this plant was raised in 1890, it proved perfectly hardy and flowers profusely.

Some thirty car-loads of California fruits, other than oranges, were disposed of in this city during last week. Among pears were Bartletts, Clapp's Favorite and Bloodgood. These are not yet fully grown and so are undersized and lacking in color. St. John, the earliest yellow peach to come from the western coast, now brings the highest prices paid for this fruit, $2.15 a box, at wholesale. Twenty car-loads of California oranges were sold at auction during the same time. The fruit was of good quality and the best brought $3.00 to $3.50 a box. Notwithstanding the arrival of about 165,000 packages of Mediterranean lemons within the past fortnight, the demand from western cities has made ready sales and prices have been high. Sicily lemons of the grade known as extra fancy command $4.50 for a box containing 300 fruits, and those known as fancy, from Majori, bring $6.50. Plums of contrasting colors give variety to the fruit-stands, as the large, roundish-oval Washington, a yellowish-green; the large flat Simoni, bright orange and red; the Satsuma or Blood Plum, introduced from Japan by Luther Burbank, its common name suggesting the color of skin and flesh. These sell for forty to fifty cents a dozen, the popular Tragedy prune costing twenty-five cents. Other varieties offered are Royal Hative, Peach, Duane Purple and German Prune. Bananas continue to arrive by the steamer load, one importer alone having twenty-one chartered vessels in this service. This fruit has recently been exceptionally good and prices last week advanced on an average of twenty cents, bunches of the largest size from Jamaica, Aspinwall, Sama, Banes and Port Limon selling for $1.25 to $1.50 by the truck load. A few boxes of Chasselas de Fontainbleau grapes are here from California. Crates of the Russian Alexander apples and the more showy white-fleshed Red Astrachan, from the same state, sell for $3.00 in the wholesale markets. Large, showy nectarines, from New England hot houses, are shown in the fancy fruit-stores and cost forty cents apiece, and grapes grown under glass in the same section sell for $1.75 a pound.